



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Michael Hinds  
Examiner: Arpad Kovacs  
Serial No.: 10/637,143                      Group Art Unit: 3671  
Filed: 08/08/2003                      (Atty. Ref. No. 16538-US)  
For: AIR-ASSISTED TOPPER/SHREDDER FOR SUGAR CANE HARVESTER

Moline, IL 61265

6 October 2004

**APPEAL BRIEF**

The Honorable Commissioner  
of Patents and Trademarks  
Washington, D.C. 20231  
Sir:

**Real Party in Interest**

The real party in interest is Deere & Company to whom this application was assigned by the applicant per the assignment document recorded in the United States Patent and Trademark Office on 12/01/2003 at Reel/Frame: 014745/0354.

**Related Appeals and Interferences**

There are no related appeals or interferences.

**Status of Claims**

Claims 1 through 6 are currently pending in the above-identified application.

Claims 1 - 3 and 6 are rejected.

Claims 4 and 5 contain allowable subject matter.

This appeal is from the rejection of claims 1 - 3 and 6.

A copy of the appealed claims is set forth in the attached Appendix.

**Status of Amendments**

A first amendment, filed on 02 July 2004, and a supplement to the first amendment, filed on 10 August 2004, were entered in their entirety and were considered in the Final

Rejection, dated 31 August 2004.

### **Summary of the Invention**

The present invention, as defined in the appealed claims, resides in a sugar cane harvester equipped with a topper/shredder for removing and shredding tops of stalks of sugar cane prior to the stalks being severed from the ground and gathered into the harvester for further processing by the harvester. The topper/shredder includes vanes for causing a stream of air for entraining the shredded tops and delivering them to a location outside the harvester throat through which the stalks pass.

Specifically, with reference to FIG. 1 and to the description beginning with paragraph [0012] of page 2 and continuing into paragraph [0014] of page 3, it can be seen that the sugar cane combine or chopper harvester 10 includes a mobile frame 12 which carries row dividers 20 and 22 that are spaced transversely from each other so as to define a throat 24 between them and which straddle a row of cane stalks which are severed from the ground by a pair of counter-rotating base cutters (not visible) as the harvester travel across the field of cane to be harvested.

A topper/shredder assembly 30 includes a parallel linkage defined by upper and lower support arms 32 and 34 having respective rear ends pivotally coupled to a support bracket 40 mounted to a forward end location of the harvester frame, and which are adjusted vertically by an extensible and retractable hydraulic cylinder 46 coupled between the lower support arm 34 and the harvester frame. Referring now also to FIG. 2, and to the description contained in paragraphs [0014] through [0019], it will be understood that a topper shredder frame 44 is pivotally mounted to the forward ends of the arms 32 and 34.

The frame 44 includes right and left, tubular L-shaped support members 48 and 50, and a central or middle tubular, L-shaped support member 74, with hydraulic motors 114R, 114L and 88 being respectively mounted within respective vertical legs 52R, 52L and 78 of the support members 48, 50, and 74. Significantly, the vertical leg 78 of the middle support member is spaced rearward of the vertical legs 52R and 52L.

The hydraulic motors 114R and 114L are respectively coupled for driving right- and left-hand gathering rotors 110L and 110R, that are respectively mounted for rotating about the vertical legs 52R and 52L. Similarly, the hydraulic motor 88 is coupled for driving a topper/shredder rotor 88 that is mounted for rotating about the vertical leg 78. Joined to and

extending beneath rear sections of horizontal legs of the support members 48, 50 and 74 are right- and left-hand wing sections 56 and 58 which include forwardly facing surfaces 60 and 62 that are concentric with the axis of rotation of, and are disposed next to the gathering rotors 110R and 110L.

Considering now also FIGS. 3 and 4, it can be seen that the gathering rotors 110L and 110R each include a center tube which supports a set of three, identical, vertically spaced gathering disks 130R or 130L. Each gathering disk is equipped with eight equally spaced gathering projections 132R or 132L. Projecting radially from and fixed to the rotor tubes, and extending between and fixed to adjacent ones of the gathering disks 130R and 130L are respective fan blades 134R and 134L. Air flow is aided by the provision of a plurality of holes in each of the disks 130R and 130L.

The topper/shredder rotor 84 includes four vertically spaced knife support disks 100, and each disk 100 has eight cutting knives 102 spaced about its periphery. Fixed to and projecting radially from the rotor tube 86, and locate between and fixed to adjacent disks 100 are a plurality of fins 104, which not only rigidify the disks 100 but act to generate air flow. Air flow is enhanced by the provision of a plurality of holes in each of the disks 100.

In operation, as the harvester 10 advances across a cane field, the counter-rotating gathering rotors 110R and 110L will engage the upper portions of standing cane stalks located in a row straddled by the row dividers 20 and 22. As these upper portions are feed to the rear, they are engaged by the rotating shredder/topper, which is rotating in a direction for conveying the shredded tops in a direction away from the cane that remains standing after the harvester passes. If this standing cane is to the right of the harvester, then the shredder/topper 84 will be driven counterclockwise so that it rotates in the same direction as does the gathering rotor 110R. With the topper/shredder rotor 84 rotating counterclockwise, the cutting knives 102 will engage and carry cane tops being delivered to it by the projections 132 of the gathering rotor 110R into engagement with the gathering rotor 110L, which in turn carries the cane tops to the point where they are cut into small pieces, i.e., shred, by the cutting action of the knives 102 carried by each of the vertically spaced knife support disks 100, with this action being enhanced by the fixed knives located in the grooves 72 and 78. Furthermore, the fins 104 of the rotor 84 will tend to deflect the air stream delivered by the fan blades 134R to the left where it is again deflected by the fan blades 134L and caused to flow to the left in front of the curved surface 62 of the left wing 58 of the frame 44. This stream of air will entrain the cut

pieces of cane top and deliver it sideways with sufficient force to cause most of the top material to the left of the throat 24 of the harvester.

### **Issues**

1. Are claims 1 - 3 unpatentable under 35 USC § 102 (b) as being anticipated by either one of Quick (WO 85/00268) or Ruback et al. (4008557)?
2. Is claim 6 unpatentable under 35 U.S. C. 102(b) as being anticipated by any one of Quick (WO 85/00268), Ruback et al. (4008557) or Makeham et al. (3596447)?

### **Grouping of Claims**

Rejected claims 2 and 3 depend directly from claim 1 and, therefore, are thought to stand together with an allowance of claim 1. Claims 2 and 3 are thought individually allowable.

Rejected claim 6 is an independent claim.

### **Arguments as to the Issues**

#### **Issue 1.**

It is submitted that the rejection of claims 1 - 3 based on 35 U.S.C. § 102 (b) as being anticipated either one of Quick or Ruback et al. is erroneous for the reason that neither of these references disclose the structure required by the claims.

Specifically, among other structure, claim 1 requires a topper/**shredder** mounted for rotation about an upright axis, with the topper/shredder including a center support disposed along said axis, at least **two** topper/shredder disks **spaced** from each other along said axis and joined to said center support, and each shredder disk having a plurality of cutting blades joined to and projecting outwardly from spaced locations about its periphery, and at least one air-assist vane **extending between said at least two shredder disks** for generating a stream of air for aiding sideways discharge of shredded cane tops from said topper/shredder element.

Quick **does not disclose** a topper/shredder, but rather discloses only a topper arrangement. Specifically, Quick discloses a pair of topper assemblies respectively including first cutter disks 84 and 86 mounted on respective first upright

axes, and second cutter disks 122 and 124 (FIG. 3) mounted on respective second upright axes where they rotate **so as to respectively cooperate** with the cutting blades 84 and 86 to effect cutting off cane tops. **No multiple cutting or shredding** of each cane top takes place, as is the case with applicant's claimed device which has **at least two shredder disks spaced along a single axis**. Furthermore, since Quick does not have the required **at least two** shredder disks, it is clear then that Quick **does not have** the required air-assist vane **extending between** said at least two shredder disks.

As concerns Ruback et al., the structure disclosed therein is substantially the same as that disclosed in Quick and consequently suffers the same deficiencies as regards meeting the structure set forth in applicant's claim 1.

In view of the above, claim 1 is thought allowable. Claims 2 and 3 depend from claim 1 and are likewise thought allowable.

Claim 2 is thought allowable for the additional reason that it requires upper, lower and intermediate shredder disks, with the air-assist vane including a first section extending between the upper and intermediate shredder disks and a second section extending between the lower and intermediate shredder disks, and neither of the cited references have the required number of disks nor the required vane sections.

Claim 3 is thought allowable for the additional reason that it requires at least three air-assist vanes mounted between the at least two shredder disks and neither of the cited references has a second shredder disk nor any vanes extending between two shredder disks.

## **Issue 2.**

It is submitted that the rejection of claim 6 based on 35 U.S.C. § 102 (b) as being anticipated any one of Quick, Ruback et al. or Makeham et al. (3596447) is erroneous for the reason that none of these references disclose the structure required by claim 6.

Claim 6 claims a method of topping can prior to the topped cane stalks passing through the throat of a cane harvester. Specifically, claim 6 requires the method steps of: (1) **cutting and shredding cane tops** as the harvester proceeds along a row of standing

cane so as to produce cane top pieces; and (2) creating a stream of air for entraining the cane top pieces and delivering them outside the harvesting throat of the harvester.

As discussed above relative to **Issue 1**, each of Quick and Ruback et al. have structure capable of **only topping** the cane stalks. No shredding blades are present for cutting these tops into pieces.

As concerns Makeham et al., **two** cutting blades 18, 20, **each mounted on its own upright axis**, are required to cooperate with each other for topping a cane stalk (see FIGS. 1 and 2). **No shredding** function is performed since no further cutting blades are spaced along the upright axes about which the blades 18 and 20 rotate. Again, like Quick and Ruback et al., since Makeham et al. do not disclose spaced apart shredder blades, then there can be no air-assist vane **extending between the spaced apart shredder blades**. While the examiner considers the fingers 25 of the **gathering chains 24** to be devices which shred, there is no support at all for this function within the disclosure of Makeham et al. If the fingers 25 did perform such a function, there would be no need for the cutting discs 18, 20.

Applicant's claimed invention of cutting, i.e., shredding, cane tops into pieces and then creating a stream of air for assisting the conveyance of cane top pieces to the side is simply not found in the applied prior art. The whole tops that result from the operation of the applied prior art devices cannot benefit from any air stream that might be generated by these devices since the tops are too heavy. They benefit more from being impelled by physical contact with the vanes and feeding parts of the prior art devices.

For the reasons stated above, appellants respectfully request that the Examiner's rejections of the claims be reversed.

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Respectfully,

  
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## **APPENDIX**

### **Claims under Appeal**

1. In a topper/shredder mechanism for a cane harvester including a rotatable topper/shredder element mounted for rotation about an upright axis, and a cane top gathering arrangement for directing cane tops to said shredder element, the improvement comprising: said topper/shredder element including a center support disposed along said axis; at least two topper/shredder disks spaced from each other along said axis and joined to said center support; each shredder disk having a plurality of cutting blades joined to, and projecting outwardly from, spaced locations about its periphery; and at least one air-assist vane extending between said at least two shredder disks for generating a stream of air for aiding sideways discharge of shredded cane tops from said topper/shredder element.

2. The topper/shredder mechanism, as defined in claim 1, wherein said topper/shredder element includes an upper, a lower and at least one intermediate shredder disk; and said at least one air-assist vane including first and second sections respectively extending between said upper and at least one intermediate disks, and between said lower and at least one intermediate disks.

3. The topper/shredder mechanism, as defined in claim 1, wherein said topper/shredder element includes at least three air-assist vanes spaced equally from each other about said axis.

6. A method of topping cane prior to topped cane stalks passing through a harvesting throat of a cane harvester, comprising the steps of:

- a. cutting and shredding cane tops as said harvester proceeds along a row of standing cane so as to produce cane top pieces; and
- b. creating a stream of air for entraining said cane top pieces and delivering them outside said harvesting throat of said harvester.